

BULLETIN

Pennsylvania Department of Agriculture

HARRISBURG

Vol. 8

September 15, 1925

No. 16

General Bulletin No. 412

How Farmers Can Secure Electric Service by Cooperative Effort

By George H. Morse, Electrical Engineer,
Pennsylvania Public Service Commission



The Electric Light and Power Line of a Farmers' Mutual Company in Lancaster County, Pennsylvania.

F. P. WILLITS, *Secretary of Agriculture*

Published semi-monthly by direction of the Secretary. Entered as second class matter, March 22, 1918, at the Post Office at Harrisburg, Pa., under the Act of June 6, 1900. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized on June 29, 1913.

PENNSYLVANIA DEPARTMENT OF AGRICULTURE.

Organization and Services

FRANK P. WILLITS, *Secretary*

JOHN M. McKEE, *Deputy Secretary*

This Department is essentially a service agency created by legislative enactment to deal with administrative, regulatory, investigational, and educational problems which can best be solved through public rather than individual action. The organization provides for coordination and cooperation with the Pennsylvania State College and the U. S. Department of Agriculture. The Department operates through the following bureaus:

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Maintains collections of insects, plant diseases, plants, and seeds, and identifies specimens.

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Regulates and issues licenses for the manufacture and sale of oleomargarine;

Licenses and regulates egg-opening plants and cold storage warehouses, maintaining regular inspection and enforcing twelve-month storage limit;

Inspects milk plants and creameries and regulates weighing, testing, buying and selling of milk and cream on a butterfat basis;

Protects honest manufacturers, importers, selling agents and ultimate users of feeding stuffs, fertilizers, lime products, linseed oil, paint, putty, turpentine, insecticides and fungicides, by means of annual registrations followed by inspections, analyses, prosecutions and the publication of the analyses of these products;

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P. R. TAYLOR, *Director.*

Investigates and assists in the marketing of farm products; at present chiefly grain and hay, fruits and vegetables, poultry and eggs, and tobacco;

Compiles and distributes daily market information as to supplies, shipments and prices;

Advises growers on transportation of agricultural products;

Assists cooperative associations and public markets;

Establishes standard grades of farm products and maintains inspection.

STATISTICS:

L. H. WIBLE, *Director.*

Assembles and disseminates essential statistics and facts pertaining to the agriculture of the State, from monthly reports rendered by hundreds of volunteer crop correspondents, information which assists the producer in his sales and interests all industries which deal with agricultural products;

Cooperates with U. S. Bureau of Agricultural Economics in joint crop and livestock reporting and publishes annual and monthly summaries of the data;

Compiles dates of county and local fairs and assembles data pertaining to their success and results during each year.

HOW FARMERS CAN SECURE ELECTRIC SERVICE BY COOPERATIVE EFFORT

By George H. Morse, Electrical Engineer,
Pennsylvania Public Service Commission

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United Effort to Secure Electricity

There are many rural districts in Pennsylvania, where electric service is much desired by farmers and others, but in which no public service company is willing to run its lines, due to the lack of sufficient population to warrant the necessary investment. It is often the case, in such localities, that the inhabitants can, by united effort, with the sacrifice of a moderate amount of time and money, establish the necessary distribution line and cause the nearest public utility to deliver electric energy to it on an equitable basis.

Methods of Procedure

The means of accomplishing this end are several, and it is the intention of this bulletin to so describe them that any community can intelligently select a suitable method and successfully apply it. Following is a list of the more promising methods of procedure.

- A. Organization of an incorporated electric light and power company.
- B. Organization of a simple association to build an extension and turn it over to a utility to maintain and operate.
- C. Organization of an association to build, own, maintain and operate an extension, buying electric energy wholesale through one meter.
- D. Organization of a partnership association, with or without the issue of stock.¹

¹Act of June 7, 1874, P. L. 271 as amended by Act of June 7, 1907, P. L. 432.

(A) Incorporated Company Established by Citizens

Electric light, heat and power companies which are active in the State of Pennsylvania are said to possess certain chartered territory. This is no other than the area of a township or borough which an original company was incorporated to serve and for which it received letters patent, or an aggregation of such areas, rights to serve which have been obtained by the merger of two or more of the original incorporated companies. While there appears to be nowhere in the Statutes of the Commonwealth the implication that the so-called chartered territory of a public utility is to be considered as exclusively the field of one utility, nevertheless, present theories of economics and the traditional attitude of the Public Service Commission have tended to establish this principle. If a chartered territory is to be considered as exclusive, its possessor is in duty bound to serve all portions of it, as far as this is economically possible. Any failure to live up to this obligation should be met by the granting, to some other utility, which stands ready and able to serve in the neglected area, permission to do so. That it is entirely feasible for a body of citizens to organize and incorporate a company to serve themselves and others when they are unable to secure service from an established utility is evident from the following example.

Morrison Cove is a valley about six miles wide and 18 miles long, entirely surrounded by mountains save for a few rather narrow passes. The southern end of the cove is taken up by South Woodbury Township in which are the three towns of Loysburg, Waterside and New Enterprise. North and east of South Woodbury Township is Woodbury Township in which is the town of Woodbury. The whole area was unserved except for two small and unreliable electric lighting plants, one in New Enterprise and the other in Woodbury Borough. A so-called paper company, namely the South Woodbury Township Power Company had secured a charter in February 1923, which had been approved by the Public Service Commission, but had given no sign up to January 15, 1925, of any activity leading to actual establishment of a distribution system. The Penn Central Light and Power Company also possessed charters of longer standing in the two townships which it had secured to accommodate its building of transmission lines. The inhabitants of the townships and towns above named, numbering approximately 3000, had petitioned the Penn Central Company to give them service but with no avail. To meet the situation three companies were organized by the citizens with the intention of merging them into one company after incorporation. The state law

requires that no company can be chartered for more than a single township or borough at its inception. The total authorized capitalization of the three companies was placed at \$20,000, in shares of \$25 each, and this was immediately over-subscribed by 174 of the citizens. Fifteen per cent was paid in and more will be paid in as required.

The attitude toward the new enterprise, on the part of the small plant owners in New Enterprise and Woodbury Borough and of the Penn Central Light and Power Company was favorable, the last named only stipulating that it be given an option for the purchase of the property and franchises of the new company at "a price to be agreed upon, or whatever the price that may then be fixed to run with the property." At the hearing held before the Public Service Commission the Attorney for the Penn Central Light and Power Company stated, in regard to the three new companies,—

"We are helping them out all we can. We are going to be compelled to put in a good many thousand dollars to be able to sell them power, our investment runs around five thousand dollars for this line, we making the tap at the gateway."

The Public Service Commission granted a certificate of public convenience evidencing the Commission's approval of the incorporation and the beginning of the exercise of the rights, powers and privileges granted thereby to the three companies. An electric service corporation thus formed is in all respects a public utility and as such is subject to regulation by the Public Service Commission.

Morrison Cove Electric Light, Heat and Power Company, which is the name under which the activities of the above described enterprise are being carried on, has now (July 1925) constructed eleven miles of 6600 volt, three wire, three phase primary line and is serving 175 consumers. It purposes adding another eleven miles of rural line in the near future.

A corporation rendering public service is designated, in the statutes, as being of the second class. The method of procedure to be followed in organizing a corporation of the second class and securing letters patent is clearly set forth in a circular issued by the Executive Department of the Commonwealth under the title "Rules Governing Applications for Letters Patent Etc., Corporations of the Second Class."

In the case cited above, the public utility having chartered rights in the territory was friendly to establishment by the citizens, of their own service corporations. The citizens were however, under no obli-

gation to give the established utility an option to purchase the property they were about to construct. It would in any case be desirable to secure friendly cooperation with a utility possessing charter rights but it is probable that such a utility, if grossly negligent in developing its territory, would be unable to interfere effectively with the securing of a patent by citizens establishing an incorporated public utility of their own.

Another example of an electric light and power company organized and incorporated by farmers as a truly mutual undertaking is found in the Pioneer Electric Light Company which owns and operates 28 miles of 2300 volt, three wire, strictly rural line in the southern end of Lancaster County.



Fig. 1. Line of the Pioneer Electric Light Company, Lancaster County, Pennsylvania. A sectionalizing oil switch is mounted below the lowest crossarm.

This line has been in highly successful operation since 1920 and at present serves through 117 consumers' meters of which 6 are for power and the remainder for lighting and small motors. There are 86 stockholders all but 3 or 4 of whom are consumers. The two largest holdings are 10 shares each. No stockholder, either by virtue of ownership or proxies is permitted to vote more than 10 shares. Here we have an example of true customer ownership and control as contrasted with pseudo customer ownership in which customer stock is of the non voting variety. The line is substantially built as may be seen from the accompanying picture.

The company finds that it costs \$1200 per mile to build main line extensions, at this time, together with transformers, meters and services

under 100 feet in length when the number of consumers per mile is six. The poles are locally grown chestnut mainly 30 feet in length. The company has had to pay nothing for right of way.

No dividends have been paid but a surplus of \$3000 has accrued. The energy is purchased from the large water power plant of the Pennsylvania Water and Power Company at Holtwood, Pennsylvania.

The magnitude of a proposed enterprise, as regards probable cost, can best be learned by having an electrical engineer go over the ground and make a preliminary estimate.

Legal services are of course necessary in accomplishing anything as complicated as the incorporation of a public utility with its attendant petition to, and hearing before the Public Service Commission. Once incorporated and with the stock issued this may be used as collateral to secure a loan if the originators do not care to furnish all of the money needed to complete the line. There is, I believe, no doubt that an extension, completed and ready to serve the public, can demand and secure, under the law, as interpreted by the Public Service Commission, electric energy at wholesale prices from any electric service company having transmission or distribution lines contiguous to its own.

(B) Organization of a Simple Association to Build an Extension

It has been and is common practice in this State for rural inhabitants to form an association for the purpose of building a telephone line to serve the members of the Association. In townships of the second class (Under 300 inhabitants per square mile) such an Association plants its poles upon the highway or county road without seeking permission except from the land owners in front of whose property the line is to pass. If the line is to occupy a highway under jurisdiction of the Highway Department a certain small fee is charged per pole but the Association's right to occupy the highway is not questioned. No permission is required by incorporated companies from townships of the second class when building electric lines therein, but any township may by resolution prescribe reasonable general regulations governing the erection or construction of any telephone system or systems across, along, over or under the public highways in such township, not inconsistent, however, with any rules or regulations adopted by the State Highway Department relating to such highways. In practice, this freedom of restraint applies also to an association desiring to erect a pole line in a township of the second class. It is however customary to seek the permission of the Super-

visor of a township, as a matter of form, when about to erect a pole line on the public roads.

The annual report of The Bell Telephone Company of Pennsylvania states: "Connections are also made with what are known as Rural Lines, which are owned by small groups of individuals who do not operate switchboards, and which are met at suitable junction points. On December 31, (1923) there were 1423 such lines serving 14,186 telephones. During 1923 the increase in telephones served by these lines was 123." Mr. R. S. Coe, who is of the staff of the Chief Statistician of the American Telephone and Telegraph Company says, in the Bell Telephone Quarterly for April 1924; "Approximately two million seven hundred thousand farm dwellings, or nearly one-half of all the rural homes in the United States, are already equipped with telephones. These figures apply to the country as a whole, which of course, includes a large number of farms occupied by immigrants, negroes and illiterate native whites. This remarkable achievement has unquestionably been facilitated by the energy and progressiveness which are characteristic of the average American farmer."

"A large proportion of the farm telephones in the United States are on lines constructed by co-operative associations or small companies organized by the farmers themselves, which connect with the systems of the larger telephone companies and through them with the long distance circuits that span the continent. This method of rural telephone construction has given very satisfactory results also in Canada."



Fig. 2. Line of the Pioneer Electric Light Company, Lancaster County, Pennsylvania. Corner pole carries a transformer and the telephone trunk line runs parallel on opposite side of road. There is no appreciable interference in operation.

There appears to be nothing in the State laws that should make it a different or more difficult undertaking to establish a mutual electric light and power line by an association of farmers than to establish a rural telephone line. It is true that an electric light and power line, if poorly built, or poorly maintained is more dangerous to life than a telephone line under like conditions. Such a line should either be constructed to meet the standards of the utility which is to serve it with electricity or under the advice of a competent electrical engineer. There are usually to be found suitable engineers practicing independently in most cities whose services could be had for a day now and then, at reasonable cost, under whose direction such a line could be properly and safely built and maintained. After the line is built, two or three visits each year from such an engineer would suffice, if his directions for repairs or improvements were faithfully carried out. Following is a description of the activities of a farmers co-operative association which recently constructed its own electric light and power line at Warrior's Mark in Huntingdon County, Pennsylvania.

The citizens of Warrior's Mark Township organized a meeting late in 1923 with the object of combining to secure electric service. Electric service, to run a rock crusher, was already being given to a quarry at a point in the valley two miles from Tyrone in the direction of Warrior's Mark Township. The center of population of the township is about six miles further along the valley beyond the quarry.

Notices of the proposed meeting were put up in the post office and all interested parties were invited to attend. The meeting was held in the evening at the Methodist Church and about 50 heads of families were present. All present entered enthusiastically into the spirit of the enterprise. The meeting organized itself into the Citizens Electric Light Project and elected a president and a secretary.

A committee was appointed to visit the General Manager of the Electric Company at Altoona and the District Manager at Tyrone. At the several meetings with the company officials the question of the cost of the extension and the amount which the consumers would undertake to contribute was taken up. The company agreed to foster the enterprise if the citizens would secure the right of way in the roads in front of the various land owners premises and have the owners sign a release giving permission to the company to maintain its lines in this location. A citizens committee was appointed to secure these permissions and papers were legally drawn which were readily signed by the land owners for a nominal consideration of one dollar each paid by the citizens organization.

There was experienced no trouble in financing the project. No

pledges were accepted for less than \$25.00. A number of pledges were secured for \$100.00 each. It was later found that \$25.00 from each prospective consumer would be sufficient although some of those who had pledged \$100 actually paid in \$50.00. Sixty consumers each actually paid \$25.00 or more.

The citizens furnished and erected poles and dug the holes in which they were set, all under the supervision of the Logan Valley Electric Light, Heat and Power Company. Part of the labor was hired by the citizens the remainder being contributed by them in kind. 30 and 35 foot poles were used with 7 to 8 inch tops. The line was built in excellent order and finally inspected and accepted by the Lighting Company which undertook maintenance and further completion of the line, at its own expense, in consideration of title to the line being turned over to it. The Company supplied the transformers and wiring while the citizens furnished the cross-arms. Where poles were required on private premises the consumer for whose benefit they were set supplied them. A final \$300. to complete the line was donated by the company after it was demonstrated that the line would be a paying asset.

The price charged for service is the same as in Tyrone the minimum being \$1.25.

One of the citizens responsible for this extension says, "This line has opened up more territory and demand for extensions. It has brought happiness, peace and comfort. It has reduced the labor of our women folks. Nearly every home that can afford it at all has a washer. Those who can afford to do so have all manner of labor saving devices."

In organizing a simple association of Class "B", it is also desirable to secure co-operation with the company which is to supply the electric energy but citizens may go ahead with such a project independently and later demand and secure electric energy from the public utility at the point in its system to which the citizens have carried their extension. That service may be thus secured is evident from a recent finding of the Public Service Commission in the case of John R. Wilson Vs. Moscow Electric Company, Complaint Docket 6351. In this case a private person built an extension 1.3 miles in length on the public road, to serve himself and later demanded and secured service from the public utility which had refused such service through action of the Commission.

That a utility having charter rights in a given locality cannot interfere with the building, by an association of farmers, of a parallel telephone line of substantial length, appears from the fact that the

Public Service Commission dismissed in 1923, a case in which the Perry County Telephone and Telegraph Company, a public utility, sought strenuously to have the Shermansdale Rural Telephone Company, an association of farmers, estopped from constructing a line to serve its members. Nothing in this case gives the idea that it would have terminated differently had the association of farmers been intent on building an electric light line instead of a telephone line.

Another case before the Public Service Commission, which bears on the same point was that of Eisworth, Hefren and Company Vs. E. J. Carroll, Et. Al., Complaint Docket No. 6217, in which twenty-two individuals having associated themselves as co-partners for the purpose of producing and purchasing natural gas and piping the same to the residences of the parties, were alleged by the complainant, to constitute a public utility and as such subject to regulation by the Commission to the end that their competition with the complainant might be eliminated. The Commission dismissed the complaint, the sole question at issue being whether the operations of the respondents constituted them a public utility.

It is not necessary for an association, which has built a pole line at its own expense to turn it over to the utility to own, in consideration of the latter undertaking maintenance and replacement but this is very frequently done with electric light and power extension lines. This relieves the builders of responsibility for accidents occurring to the public due to presence of the line, a responsibility which otherwise devolves upon the association members which figure as partners, since such an association is construed to be a partnership in the eyes of the law.

The facts appear to be that no individual or unincorporated association has a right to build an electric light line on the public roads, although a property owner would have a right to place a pole in front of his property for his own convenience; and no one has authority to grant permission to build such a line, to interfere with its being built or have it removed except by an action at law based on its being a nuisance interfering with use of the roads by the public. It might be possible to have it removed if it interfered seriously with the building of another line by a public utility.

(C) Organization of an Association to Build, Maintain and Operate an Extension

The organization in this case does not differ essentially from that under "B" except that it may be advisable to proceed in a more

formal manner since the association is going to build, own, maintain and operate the extension. An organization of this sort is and remains a partnership and each individual member is liable for all of the debts or damages assessed against the association. The liability as to damages during the construction period and also the operating period may be offset by means of insurance as follows:

Members of an association, or co-partnership, which has built and owns, operates and maintains a rural electric light and power line may, by means of an aggregate payment of \$100 per annum, relieve them-



Fig. 3. Line of the Pioneer Electric Light Company, Lancaster County, Pennsylvania. The pole in the foreground carries a transformer at its top.

selves of liability for accident to any one person, suffered on account of the presence of the line on the highway, up to an amount of \$5000. or for accidents to more than one person up to \$10,000. \$120. per annum relieves them of liability up to \$10,000. per person injured or \$20,000. for more than one person; and payment of \$130. per annum up to \$15,000. and \$30,000. respectively.

It is common practice for an association, which wishes to retain ownership of its line but be relieved of operation and maintenance and liability for injury to the public, to lease the line for a nominal consideration of a dollar, to the public utility which is to provide the electric energy. The utility then operates and maintains the line and assumes the risks receiving its pay in the form of a rate for service

considerably higher than when it merely sells energy at the gateway or point of attachment of the extension to its own distribution system.

When the utility maintains and operates the extension it bills the members of the association separately for its service. When the association maintains and operates it will itself bill the individuals of the association, buying the energy at wholesale through a single meter. Under the title "Some Iowa Rural-Line Practices" the Electrical World of March 17, 1923, says:—"A good example of the present rural line practice of the Iowa Railway and Light Company is the 6600 volt, single phase, 60-cycle line south of Fairfax, which was built about three years ago. Thirty farmers raised slightly more than \$5000. to build the eleven miles of line, to which they added a considerable amount of labor contributed by the farmers themselves. The line was built by a utility employee loaned for the purpose. In the contract with the utility for wholesale power it is specified that the local company, the South Fairfax Electric Company, shall follow the specifications drawn for such lines by the Iowa Board of Railroad Commissioners. * * * * (The master meter is installed at the beginning of the line out of Fairfax in a box at the foot of a pole). Energy is sold wholesale to the corporation and each farmer reads his own meter. These readings are sent to the secretary of the company, who handles the billing that divides the expense of energy, maintenance and other expenses between the farmers getting service. The rate to the South Fairfax Electric Company is made up of a monthly demand charge per kilovolt ampere plus a service charge of \$5. per month. An energy rate of 2½ cents is charged for the consumption shown by the master meter."

What has been said in connection with "B" in regard to the ability of an association to demand and secure service from the lines of a public utility contiguous to its own extension and the character of lines that should be constructed also apply to the present case. It should be noted that the Public Service Commission either has or probably will shortly adopt rules setting minimum standard requirements for the construction of rural electric light and power lines. While an association of the character here described, serving only its own members, is independent of the Public Service Commission's rules, it is unlikely that the Commission will permit a public utility to give service to rural lines which possess a lesser degree of strength and safety than approved in its rules.

Following is a set of co-partnership articles adapted to be used by an association of Class "C"

ARTICLES OF CO-PARTNERSHIP

We, the undersigned, do by these presents associate ourselves together and hereby form a co-partnership, and to that end do hereby agree upon the following Articles of Co-partnership, to-wit:

ARTICLE I. The name of said co-partnership is the Rural Electric Light and Power Company. (There must be filed in the office of the Secretary of the Commonwealth and in the office of the Prothonotary, a certificate, under oath, and signed by the members of the co-partnership, setting forth the real name or names and addresses of all the persons owning or interested in the business, and also the name, style, or designation under which said business is being or will be carried on or conducted). It shall commence on theday of 192.. and continue for a period of ten years, and its principal office shall be in the of in the County of and State of Pennsylvania.

ARTICLE II. The object of this co-partnership and the general nature of the business to be by it conducted, is to acquire, construct, maintain and operate a rural electric light and power line, solely for the use of its members, connected with the lines of the public utility known as the hereinafter called the Service Company.

ARTICLE III. The money necessary for the construction of the lines of said Rural Electric Light and Power Company shall be raised by subscription from each member of this co-partnership, and each member hereby agrees to pay to the Treasurer of said co-partnership his proportionate share of the cost of constructing and maintaining said electric light and power line, and to pay the amount of his assessment within thirty days from receiving written notice from the Treasurer of said co-partnership.

ARTICLE IV. The business of this co-partnership shall be conducted through the following officers: President, Vice-President, Secretary and Treasurer, andManagers, one of whom shall be authorized to act as the co-partnership's agent to represent it in its business relations with the Service Company, said officers to be elected annually, as hereinafter provided.

ARTICLE V. The President shall preside at all meetings of the co-partnership or the Board of Managers, sign all official documents, ex-

cepting as hereinafter provided, and perform such duties as may be required of him by the Board of Managers. The Vice President shall act in place of the President in case of his absence or inability. The Secretary shall keep a record of all meetings of the officers or managers, and perform such other duties as may be required of him by said managers. The Treasurer shall be the custodian of all funds of the co-partnership, and keep a set of books showing the receipts and expenditures of said co-partnership, and shall, from time to time, render a statement to the managers showing the financial condition of said co-partnership whenever said managers shall require same. The principal duties of the Board of Managers shall be to co-operate with the officers, and by their advice further the interests of the co-partnership, and when any question arises pertaining to the welfare of the co-partnership that cannot be settled by the officers, the said Board of Managers shall act as an arbitrating board in settling the same. The officer elected agent shall be authorized to incur any obligations covered by the agreement with the Service Company, and to pay any sums which may become due to it under such agreement.

ARTICLE VI. The undersigned hereby adopt the following rules and regulations, and make said rules and regulations a part of the Articles of Co-partnership; and agree to be jointly and severally bound under said rules and regulations:

- 1—Any adult person, firm or corporation, occupying a residence or place of business which may be conveniently connected with the lines of the co-partnership, may become a member thereof, upon the payment of a fee equal to the amount required of the original shareholder, as hereinafter provided.
- 2—Each member of this co-partnership is entitled to one vote at all its meetings.
- 3—An annual meeting of this co-partnership shall be held at such place as the officers may designate, on the second Monday of January in each year, at 10 o'clock A. M., for the purpose of electing officers, managers and agent, and transacting any and all business pertaining to the welfare of said co-partnership. It shall be the duty of the Secretary to notify each member of the place where such meeting shall be held, and no further notice of such meeting shall be required. Special meetings may be held at any time upon the request of a majority of the Board of Managers or upon request of the members. The President

may call a special meeting at any time he deems it necessary for the interest of the co-partnership. The members of this co-partnership shall be given five days' written notice of any such special meetings.

- 4—A quorum for the transaction of any business of this co-partnership, at any of its meetings, shall be two-thirds of its entire membership, and any action pertaining to the co-partnership affairs, taken by said quorum, shall be binding upon all the members.
- 5—Whenever a member of this co-partnership shall refuse or neglect to pay such dues, moneys, or fail to meet any financial obligation of this co-partnership, it shall be the duty of the Secretary to send such member written notice of the required amount; the officers of said co-partnership may order the connection of said member disconnected, and he shall be refused the use of the lines of said co-partnership and his membership shall be declared forfeited; provided, however, said member may be reinstated within thirty days upon the payment of the required amount and a further fee of five (\$5.00) dollars for such disconnection and reconnection.
- 6—Any person becoming a member of this co-partnership after the line has been constructed and is in operation shall be bound by all the rules in force, as if he had been an original member, and may, by the payment of a sum equal to the amount subscribed by such original member, in addition to the sum required to construct his portion of the line and to install his service connection, enjoy all the rights and privileges of an original member.
- 7—Each member of this co-partnership shall be liable [In addition to his general liability as a co-partner) for his proportion of the cost of keeping the lines and equipment in good working order; and whenever trouble or damage of any nature occurs to said lines in the immediate vicinity of any of the respective members' homes or places of business, said members shall promptly report said trouble or damage to the official of the co-partnership who has charge of the physical condition of the lines, and give such immediate personal assistance in effecting repairs as may reasonably be requested by the said official, but no repairs shall be attempted without his knowledge and co-

operation, and not until it is certain that the wires have been made dead by the opening of the proper switch and that such switch will, without question, be kept open until the repairs have been reported as completed.

8—It is further understood and agreed that each member of this co-partnership shall be and is personally liable to the Service Company under all the conditions and rules hereinbefore set forth, in so far as said conditions and rules appertain to business of said Service Company, and each said member hereby agrees to be bound by any contract or contracts entered into by and between the Service Company and the Rural Electric Light and Power Company, and upon the execution of any contract by and between said companies, the members of this co-partnership shall be jointly and severally liable.

9—The agent of this co-partnership is hereby authorized to enter into all necessary agreements and to execute said agreements with the Service Company in the name of the Rural Electric Light and Power Company, and upon the signing and execution of said agreements by the agent of said co-partnership, each member hereby agrees to be personally liable under all the terms of said agreements.

In witness Whereof, we have hereunto set our hands and seals this day of 192....,

.....
President
.....
Secretary

(D) Organization of a Partnership Association

The term "Partnership Association" as used in the statutes is the title of a very distinct type of organization governed by a complete set of rules under enactment, the initial one reading as follows:

"When any three or more persons may desire to form a partnership association, for the purpose of conducting any lawful business or occupation, including the construction, equipment, installation, and operation of a telephone or telegraph line, within the United States, or elsewhere, whose principal office or place of business shall

be established and maintained within this state; by subscribing and contributing capital thereto, which capital shall alone be liable for the debts of such association, it shall and may be lawful for such persons to sign and acknowledge, before some officer competent to take the acknowledgment of deeds, a statement, in writing, in which shall be set forth the full names of such persons, and the amount of capital of said association subscribed for by each; the total amount of capital, and when and how paid; the character of the business to be conducted, and the location of the same; the name of the association, with the word "limited" added thereto as a part of the same; contemplated duration of said association, which shall not in any case exceed twenty years, and the names of the officers of said association, selected in conformity with the provisions of this act; and any amendment of said statement shall be made only in like manner; which said statements and amendments shall be recorded in the office of the recorder of deeds of the proper county."

This appears to be an ideal form of association to be organized by a body of rural dwellers who wish to purchase electric energy and distribute the same to members only. No member is liable for more than his subscribed portion of the established capital either in regard to debts of the association or damages which may be assessed against the association. Interest in such partnership associations are personal estate, and may be transferred, given, bequeathed, distributed, sold or assigned, under such rules and regulations as such partnership associations shall from time to time prescribe by a vote of a majority of the members in number and value of their interests. Stock may be issued and sold if this form of evidence of participation is desired. Such a partnership association is independent of the Public Service Commission when it confines its service to its own members except for such control as the Commission is able to exercise through the public utility from which electric energy is purchased.

The Articles of Association heretofore given for a co-partnership may, with slight modification, be adapted for use in organizing a partnership association.

Cost of an Electric Light and Power Extension

If an association of farmers is intending to construct a line extension and turn it over, upon completion, to a public utility to own, operate and maintain, it is reasonable to ask the utility to furnish a part of the money required unless the utility will have to spend money

to bring its own lines up to the point where the attachment is to be made. Many utilities stand ready to invest from two to three times the amount of gross annual revenue which it is estimated will be received from an extension. This will ordinarily amount to, from \$25.00 to \$50.00 per rural consumer.

Electric light and power lines are today usually constructed in accordance with the National Electrical Safety Code prepared by the Bureau of Standards at Washington and to be had, in cloth binding for forty cents, from the Superintendent of Documents, Government Printing Office, Washington, D. C.

The Public Service Commission of the Commonwealth of Pennsylvania is engaged in preparing a code of its own which, when completed, is expected to contain a division establishing minimum standard requirements for the construction of rural electric light and power lines.

The Report of the Giant Power Survey, to be had of the Superintendent of Documents at Harrisburg, Pa., contains much information on the subject of rural electrification, power consumption in farm operations and detailed estimates on the cost of rural lines in various parts of the state as calculated by a number of the leading public utilities.

The cost of constructing a rural electric light and power line, as performed by an association of farmers will depend largely upon the possibility of securing native poles of suitable size and the quantity of labor which the builders are prepared to donate to the enterprise.

They are as capable as any one of digging the holes, transporting and setting the poles, and trimming trees which may interfere with the wires. These operations represent by far the major portion of the labor required, leaving only the stringing of the wires and setting of transformers for experienced linemen to perform. Even these latter operations could be accomplished by the farmers themselves if they have secured the services of an electrical engineer to show them how the work should be done and inspect the line before it is put into service. Such service need take but a little of a specialist's time, one or two visits at the right time being sufficient.

The following table gives minimum and maximum estimates for the cost of a mile of suitable line to serve farms in a rural district. The voltage is taken as 6900 volts and the line is to be single phase

(two wires) with poles spaced 175 feet apart. Poles and labor are included at average prices. Transformers and service connections from the street to the consumers buildings have not been included. The cost of right-of-way has not been included for the reason that this is an item which is entirely within the control of farmers themselves and may be made prohibitive or done away with altogether as they see fit. When the fact is considered that electrification will add not less than \$1000 to the value of a 150 acre farm the short sightedness of demanding money for the passage of a pole line along the highway in front of the farm, or even across a corner of it, may easily be demonstrated.

One Mile of 6900 Volt Primary, Single Phase Line with Poles 175 Feet Apart.

Poles—Untreated Chestnut

		Min.	Max.
20-30' @ \$6.20	\$124.00		
5-35' @ 8.87	44.35		
3-40' @ 11.25	33.75		
2-45' @ 13.75	27.50		
	<hr/>		
	\$229.60	\$229.60	\$229.60

Cross-Arms

4-pin arm	.75
Pins, braces, bolts	.80

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Insulators

60 @ .35/ .65 cents	21.00	39.00
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Wire

No. 4 H. D. bare copper, 16 cents base, 1400 lbs.		
@ 16½ cents	232.00	232.00

Tie wire No. 16 S. C.	2.00	2.00
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Labor on poles, expense and labor, digging, setting, framing and stringing	240.00	450.00
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Drayage of poles, wire X-arms, insulators per pole \$2.50 to \$3.50	75.00	105.00
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Guying per mile

At four points of change in direction

At 2/3 of a dead end per mile

At 1-1/3 branches per mile

Labor and material	95.15	126.23
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Use of tools	5.50	5.50
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Engineering, contingencies and office overhead during construction @ 10% and 12% on foregoing	94.67	148.30
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Supervision	35.00	50.00
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Interest during construction @ 1-3/4%

	<hr/>	<hr/>
	\$1076.42	\$1434.13
	18.84	25.10
	<hr/>	<hr/>
	\$1095.26	\$1459.23

A service of average length and capacity, including meter, will cost from \$35.00 to \$50.00, of which about \$11.00 is chargeable to

cost of meter and its installation. Especially where the customers are few and far between, individual service lines usually require an individual transformer. For a good sized rural connection permitting the use of a 10 horsepower motor a suitable transformer would cost \$150.00, while for lighting only a 1-½ kilowatt transformer would suffice at a cost of about \$65.00.

The Underwriters Inspection Bureau

The Underwriters Association of the Middle Department, 316 Walnut Street, Philadelphia, maintains a bureau of electric inspection which covers all of the State save Allegheny, Chester, Bucks, Montgomery, Philadelphia and Delaware Counties.¹ It keeps 45 inspectors busy and aims to inspect every job of electric wiring put in, even on most remote farms. Its requirements are those of the National Electrical Code of 1923. Inspection is as exacting in the country districts as in town residences. This code of rules can be had for the asking by any farmer and contains all he needs to know to do his own wiring but he will doubtless experience difficulty in comprehending the printed directions since they are quite technical. The electrical inspection department of the Middle Department desires to be consulted on any and all electrical problems as applied to correct interpretation of the rules in the 1923 edition of the Code. Commentaries by various authors attempt to explain the code in greater clarity and detail, but even with these in hand, one who does not make a business of electric wiring is not likely to have his work passed without the necessity of making corrections, unless he confines himself to a very simple installation.

¹Inspections in Allegheny County are made by the Allegheny County Board of Fire Underwriters of Pittsburgh; in Bucks, Chester, Delaware and Montgomery Counties by the Philadelphia Suburban Underwriters Association, Walnut Street, Philadelphia; in Philadelphia County by the Philadelphia Board of Fire Underwriters, Fourth Street, Philadelphia.

